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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/944,499	08/30/2001	Salman Akram	3936.1US (99-0066.1)	4371

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EXAMINER

CHAMBLISS, ALONZO

ART UNIT PAPER NUMBER

2827

DATE MAILED: 01/08/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/944,499

Applicant(s)

AKRAM ET AL.

Examiner

Alonzo Chambliss

Art Unit

2827

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 July 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-32 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 February 2002 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2,7,8,9.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

1. Pre-amendment A filed on 2/7/02 has been fully considered and made of record in Paper No. 3.
2. The substitute specification filed on 2/7/02 has been fully considered and made of record in Paper No. 4.

Information Disclosure Statement

3. The information disclosure statement (IDS) submitted on 1/25/02 in Paper No. 2, 2/7/02 in Paper No. 6, 3/26/02 in Paper No. 8, and 7/31/02 in Paper No. 9 was filed before the mailing date of the non-final rejection on 1/5/03. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Drawings

4. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: 206, 208, 212, 116, 124, 130A, 130B, and 148. A proposed drawing correction, corrected drawings, or amendment to the specification to add the reference sign(s) in the description, are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

5. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed. The following title is suggested: " STABILIZERS UTILIZED IN A FLIP-CHIP TYPE SEMICONDUCTOR DEVICES ".

Claim Objections

6. Claims 8 and 19 are objected to because of the following informalities: the word "plane " is misspelled. Appropriate correction is required.

Claim Rejections - 35 USC § 112

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 2 and 27 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

9. In Claims 2 and 27, the phrase " contact pads will extend beyond said active surface " is vague and indefinite, since the phrase language is confusing.

Claim Rejections - 35 USC § 102

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

11. Claims 1-3, 7, 8, 10, 11, 25-28, and 32, insofar as definite, are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Kuniaki et al. (JP 10-189653).

With respect to Claims 1, 25, and 32, Kuniaki teaches a substrate 2 having an active surface 4a with contact pads 7 exposed thereto, said contact pads 7 being configured to be connected with conductors 11 on a first surface of another semiconductor device 3; and at least one stabilizer 12 protruding from the active surface 4a and positioned between a periphery of the active surface 4a and the contact pads 7. The stabilizer 12 is configured to allow an insulative underfill material 15 to flow into a space created when the substrate 2 is connected with the semiconductor device 3. The stabilizer 12 is preformed separately from the substrate 2 and subsequently attached to the active surface 4a of the substrate 2 (see English translation, paragraphs 17-25; see all figures).

With respect to Claims 2 and 27, Kuniaki teaches wherein the at least one stabilizer 12 protrudes from the active surface 4a a distance no more than a distance that at least one conductive structure 11 to be disposed in contact with at least one of the contact pads 7e while the contact pads 7e extends beyond the active surface 4a (see English translation, paragraph 24).

With respect to Claims 3 and 28, Kuniaki teaches wherein the at least one stabilizer 12 protrudes from the active surface 4a a distance that permits conductive

structures 11 on the contact pads 7 to contact the conductors 14 of the another semiconductor device 3 (see English translation, paragraphs 22 and 23; Fig. 2).

With respect to Claim 7, Kuniaki teaches wherein the at least one stabilizer 12 is positioned proximate a corner of the active surface 4a (see Figs. 1, 3-6).

With respect to Claim 8, Kuniaki teaches wherein the at least one stabilizer 12 has a cross-sectional round plane (see all figures).

With respect to Claim 10, Kuniaki teaches further comprising protruding conductive structures 11 in contact with selected ones of the contact pads 7 (see Figs. 1 and 3-7).

With respect to Claims 11, Kuniaki teaches wherein the conductive structures 11 comprise of solder bumps (see English translation, paragraphs 22-24).

With respect to Claim 26, Kuniaki teaches wherein said at least one stabilizer 12 is configured so that voids do not occur in said insulative underfill material 15 when the insulative underfill material 15 is flowed into the space created when the substrate 2 is connected with the semiconductor device 3 (see English translation, paragraph 24; Fig. 2).

12. Claims 1, 3-5, 7-11, 31, and 32, insofar as definite, are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Watanabe (JP 58-157146).

With respect to Claims 1, 31, and 32, Watanabe teaches a substrate 4 having an active surface with contact pads 5 exposed thereto, the contact pads 5 being configured to be connected with conductors 3 on a first surface of another semiconductor device 1; and at least one stabilizer 6 protruding from the active surface and positioned between

a periphery of the active surface and the contact pads 5. The stabilizer 6 is fabricated directly on the active surface of the substrate 4. The stabilizer 6 is preformed separately from the substrate 4 and subsequently attached to the active surface of the substrate 4 (see English abstract and all figures).

With respect to Claim 3, Watanabe teaches wherein the at least one stabilizer 6 protrudes from the active surface a distance that permits conductive structures 3 on the contact pads 5 to contact the conductors 2 of the another semiconductor device 1 (see Fig. 1).

With respect to Claims 4 and 5, Watanabe teaches wherein the at least one stabilizer 6 comprises a dielectric photocurable material (see English abstract).

With respect to Claim 7, Watanabe teaches wherein the at least one stabilizer 6 is positioned proximate a corner of the active surface 4a (see Figs. 1, 3-6).

With respect to Claim 8, Watanabe teaches wherein the at least one stabilizer 6 has a cross-sectional round plane (see Fig. 2).

With respect to Claim 9, Watanabe teaches at least one stabilizer 6 is elongated in a direction parallel to the active surface (see Fig. 1).

With respect to Claim 10, Watanabe teaches further comprising protruding conductive structures 3 in contact with selected ones of the contact pads 5 (see Fig. 1).

With respect to Claims 11, Watanabe teaches wherein the conductive structures 5 comprise of conductive columns (see Fig. 1).

Claim Rejections - 35 USC § 103

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

14. Claims 6 and 13-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Watanabe (JP 58-157146) as applied to claims 1 and 5, above, and further in view of Blanton (U.S. 5,220,200).

With respect to Claims 6, 13, 16, and 17, Watanabe fails to disclose a stabilizer with a plurality of superimposed, contiguous, mutually adhered layers. However, Blanton discloses a stabilizer 40a-40f made of dielectric photocurable material (i.e. glass) with a plurality of superimposed, contiguous, mutually adhered layers (see col. 6 lines 62-68 and col. 7 lines 7-43). Therefore, it would have been obvious to incorporate the plurality of adhered layers with the device of Watanabe, since the plurality of

adhered layers would improve the adhesion between the chip and the substrate while having a similar material as the circuit components as taught by Blanton.

With respect to Claim 14, Blanton discloses wherein the at least one stabilizer 40a-40f protrudes from the active surface 32 distance no more than a distance that at least one conductive structure 20 to be disposed in contact with at least one of the contact pads 42 while the contact pads 42 extends beyond the active surface (see Figs. 1-3).

With respect to Claim 15, Watanabe discloses wherein the at least one stabilizer 6 protrudes from the active surface a distance that permits conductive structures 3 on the contact pads 5 to contact the conductors 2 of the another semiconductor device 1 (see Fig. 1).

With respect to Claim 18, Watanabe discloses wherein the at least one stabilizer 6 is positioned proximate a corner of the active surface 4a (see Figs. 1, 3-6).

With respect to Claim 19 and 20, Blanton discloses at least one stabilizer having an elongated cross-sectional plane of quadrilateral shape that is parallel to the active surface (see Figs. 1 and 3).

With respect to Claim 21, Watanabe discloses further comprising protruding conductive structures 3 in contact with selected ones of the contact pads 5 (see Fig. 1).

With respect to Claims 22, Watanabe discloses wherein the conductive structures 5 comprise of conductive columns (see Fig. 1).

With respect to Claim 24, Blanton discloses wherein the at least one stabilizer 40a-40f maintains a substantially uniform distance between the active surface 32 and the first surface of the semiconductor device 10 (see Fig. 3).

15. Claims 29 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuniaki et al. (JP 10-189653) as applied to claims 1 and 25, above, and further in view of Blanton (U.S. 5,220,200).

With respect to Claims 29 and 30, Watanabe fails to disclose a stabilizer with a plurality of superimposed, contiguous, mutually adhered layers. However, Blanton discloses a stabilizer 40a-40f made of dielectric photocurable material (i.e. glass) with a plurality of superimposed, contiguous, mutually adhered layers (see col. 6 lines 62-68 and col. 7 lines 7-43). Therefore, it would have been obvious to incorporate the plurality of adhered layers with the device of Watanabe, since the plurality of adhered layers would improve the adhesion between the chip and the substrate while having a similar material as the circuit components as taught by Blanton.

16. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kuniaki et al. (JP 10-189653) as applied to claim 1, above, and further in view of Sato (U.S. 6,287,895).

With respect to Claim 12, it is well known in the semiconductor industry that a substrate comprises a semiconductor wafer with a plurality of dice thereon as evident by Sato see col. 5 lines 16-39; Figs. 5, 6A, and 6B.

17. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Watanabe (JP 58-157146) and Blanton (U.S. 5,220,200) as applied to claim 13, above, and further in view of Sato (U.S. 6,287,895).

With respect to Claim 23, it is well known in the semiconductor industry that a substrate comprises a semiconductor wafer with a plurality of dice thereon as evident by Sato see col. 5 lines 16-39; Figs. 5, 6A, and 6B.

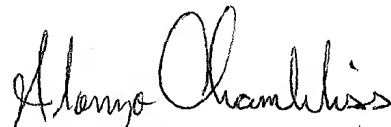
The prior art made of record and not relied upon is cited primarily to show the product of the instant invention.

Conclusion

18. Any inquiry concerning the communication or earlier communications from the examiner should be directed to Alonzo Chambliss whose telephone number is (703) 306-9143. The fax phone number for this Group is (703) 308-7722 or 7724.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-7956.

AC/January 5, 2003


Alonzo Chambliss
Examiner
Art Unit 2827